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Full text available: pdf(123.18 KB) Additional Information: full citation, abstract, index terms

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Yervant Zorian, Sujit Dey, Michael J. Rodgers
November 2000 **Proceedings of the 2000 IEEE/ACM international conference on Computer-aided design**
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February 2003 **ACM Transactions on Embedded Computing Systems (TECS)**, Volume 2 Issue 1

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Embedded systems are often designed under stringent energy consumption budgets, to limit heat generation and battery size. Since memory systems consume a significant amount of energy to store and to forward data, it is then imperative to balance power consumption and performance in memory system design. Contemporary system design focuses on the trade-off between performance and energy consumption in processing and storage units, as well as in their interconnections. Although memory design is as ...

Keywords: Embedded systems, embedded memories, integration, memories, nonvolatile, system-on-a-chip, volatile

2 eNVy: a non-volatile, main memory storage system

Michael Wu, Willy Zwaenepoel

November 1994 **Proceedings of the sixth international conference on Architectural support for programming languages and operating systems**, Volume 29 , 28 Issue 11 , 5

Full text available: pdf(1.32 MB) Additional Information: full citation, abstract, references, citings, index terms

This paper describes the architecture of eNVy, a large non-volatile main memory storage system built primarily with Flash memory. eNVy presents its storage space as a linear, memory mapped array rather than as an emulated disk in order to provide an efficient and easy to use software interface.Flash memories provide persistent storage with solid-state memory access times at a lower cost than other solid-state technologies. However, they have a number of drawbacks. Flash chips are ...

3 Services: ELF: an efficient log-structured flash file system for micro sensor nodes

Hui Dai, Michael Neufeld, Richard Han

November 2004 **Proceedings of the 2nd international conference on Embedded networked sensor systems**

Full text available: pdf(291.68 KB) Additional Information: full citation, abstract, references, index terms

An efficient and reliable file storage system is important to micro sensor nodes so that data can be logged for later asynchronous delivery across a multi-hop wireless sensor network. Designing and implementing such a file system for a sensor node faces various challenges. Sensor nodes are highly resource constrained in terms of limited runtime memory, limited persistent storage, and finite energy. Also, the flash storage medium on sensor nodes differs in a variety of ways from the traditiona ...

Keywords: eeprom, file system, flash, log structured, reliability, sensor

4 An efficient r-tree implementation over flash-memory storage systems

Chin-Hsien Wu, Li-Pin Chang, Tei-Wei Kuo

November 2003 **Proceedings of the 11th ACM international symposium on Advances in geographic information systems**

Full text available: pdf(190.75 KB) Additional Information: full citation, abstract, references, index terms

For many applications with spatial data management such as Geographic Information Systems (GIS), block-oriented access over flash memory could introduce a significant number of node updates. Such node updates could result in a large number of out-place updates and garbage collection over flash memory and damage its reliability. In this paper, we propose a very different approach which could efficiently handle fine-grained updates due to R-tree index access of spatial data over flash memory. The ...

Keywords: GIS, R-tree, embedded systems, flash memory, spatial index structures, storage systems

5 Security on FPGAs: State-of-the-art implementations and attacks

Thomas Wollinger, Jorge Guajardo, Christof Paar

August 2004 **ACM Transactions on Embedded Computing Systems (TECS)**, Volume 3 Issue 3

Full text available: pdf(296.79 KB) Additional Information: full citation, abstract, references, index terms

In the last decade, it has become apparent that embedded systems are integral parts of our every day lives. The wireless nature of many embedded applications as well as their omnipresence has made the need for security and privacy preserving mechanisms particularly important. Thus, as field programmable gate arrays (FPGAs) become integral parts of embedded systems, it is imperative to consider their security as a whole. This contribution provides a state-of-the-art description of security issues ...

Keywords: Cryptography, FPGA, attacks, cryptographic applications, reconfigurable hardware, reverse engineering, security

6 Pen computing: a technology overview and a vision

André Meyer

July 1995 **ACM SIGCHI Bulletin**, Volume 27 Issue 3

Full text available: pdf(5.14 MB) Additional Information: full citation, abstract, citings, index terms

This work gives an overview of a new technology that is attracting growing interest in public as well as in the computer industry itself. The visible difference from other technologies is in the use of a pen or pencil as the primary means of interaction between a user and a machine, picking up the familiar pen and paper interface metaphor. From this follows a set of consequences that will be analyzed and put into context with other emerging technologies and visions.Starting with a short historic ...

7 Logical and physical design issues for smart card databases
Cristiana Bolchini, Fabio Salice, Fabio A. Schreiber, Letizia Tanca
July 2003 **ACM Transactions on Information Systems (TOIS)**, Volume 21 Issue 3

Full text available: pdf(1.12 MB) Additional Information: full citation, abstract, references, citings, index terms

The design of very small databases for smart cards and for portable embedded systems is deeply constrained by the peculiar features of the physical medium. We propose a joint approach to the logical and physical database design phases and evaluate several data structures with respect to the performance, power consumption, and endurance parameters of read/program operations on the Flash-EEPROM storage medium.

Keywords: Design methodology, access methods, data structures, flash memory, personal information systems, smart card

8 How application/technology evolutions will shape classical EDA?: System-on-chip beyond the nanometer wall
Philippe Magarshack, Pierre G. Paulin
June 2003 **Proceedings of the 40th conference on Design automation**

Full text available: pdf(454.87 KB) Additional Information: full citation, abstract, references, citings, index terms

In this paper, we analyze the emerging trends in the design of complex Systems-on-a-Chip for nanometer-scale semiconductor technologies and their impact on design automation requirements, from the perspective of a broad range SoC supplier.We present our vision of some of the key changes that will emerge in the next five years. This vision is characterized by two major paradigm changes. The first is that SoC design will become divided into four mostly non-overlapping distinct abstraction levels. ...

Keywords: design automation tools, embedded software technologies, multi-processor systems, network-on-chip, reconfigurable systems, system-on-chip

9 Papers: Wireless data communications using DECT air interface
António Muchaxo, Alexandre Sousa, Nuno Pereira, Helena Sarmento
April 1999 **ACM SIGCOMM Computer Communication Review**, Volume 29 Issue 2

Full text available: pdf(1.25 MB) Additional Information: full citation, abstract, references, citings

DECT is an approved ETSI standard for cordless communications, defined as a general radio access technology that can be used as the air interface to any network. In addition to the well-established voice service, it supports data communications. DECT currently addresses low bit rates, but additional modulation options have recently been included for high-speed, up to 2Mbps. In this paper, we describe the hardware and software design of an entire wireless communications system to be used in SOHO ...

10 Session summaries from the 17th symposium on operating systems principle (SOSP'99)
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Full text available: pdf(439.06 KB) Additional Information: full citation, abstract, references, citings, index terms

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Steven W. Schlosser, John Linwood Griffin, David F. Nagle, Gregory R. Ganger

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Timothy Sherwood, Brad Calder

November 2001 **Proceedings of the 2001 international conference on Compilers, architecture, and synthesis for embedded systems**

Full text available: pdf(299.03 KB) Additional Information: full citation, abstract, references, index terms

Increased systems level integration has meant the movement of many traditionally off chip components onto a single chip including a processor, instruction storage, data path, and local memory. The design of these systems is driven by two conflicting goals, the need for reduced area and the need for rapid development times. The two current design options for instruction storage, ROM and Flash, are each highly optimized to one of these two goals but provide little compromise between them. ROM is u ...

14 Firmware factory & forth

Brad Eckert

December 1999 **ACM SIGPLAN Notices**, Volume 34 Issue 12

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T. E. Anderson, M. D. Dahlin, J. M. Neefe, D. A. Patterson, D. S. Roselli, R. Y. Wang

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February 1996 **ACM Transactions on Computer Systems (TOCS)**, Volume 14 Issue 1

Full text available: pdf(2.69 MB) Additional Information: full citation, abstract, references, citings, index terms

We propose a new paradigm for network file system design: serverless network file systems. While traditional network file systems rely on a central server machine, a serverless system utilizes workstations cooperating as peers to provide all file system services. Any machine in the system can store, cache, or control any block of data. Our approach uses this location independence, in combination with fast local area networks, to provide better performance and scalability th ...

Keywords: RAID, log cleaning, log structured, log-based striping, logging, redundant data storage, scalable performance

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Frank Vahid, Ann Gordon-Ross

August 2001 **Proceedings of the 2001 international symposium on Low power electronics and design**

Full text available: pdf(230.48 KB) Additional Information: full citation, references, index terms

Keywords: cores, embedded systems, low-power, parameterized architectures, platforms, self-optimizing architecture, system-on-a-chip, tuning

18 The Chinook hardware/software co-synthesis system

Pai H. Chou, Ross B. Ortega, Gaetano Borriello

September 1995 **Proceedings of the 8th international symposium on System synthesis**

Full text available: pdf(79.55 KB) Publisher Site Additional Information: full citation, abstract, references, citings, index terms

Abstract: Designers of embedded systems are facing ever tighter constraints on design time, but computer-aided design tools for embedded systems have not kept pace with these trends. The Chinook co-synthesis system addresses the automation of the most time-consuming and error-prone tasks in embedded controller design, namely the synthesis of interface hardware and software needed to integrate system components, the migration of functions between processors or custom logic, and the co-simulation ...

Keywords: Chinook hardware/software co-synthesis system, computer-aided design tools, custom logic, design co-simulation, design time constraints, embedded controller design, error-prone tasks, function migration, interface hardware, interface software, logic CAD, logic design, microcontrollers, microprocessors, real-time systems, software tools, system components integration

19 Integrating reliable memory in databases

Wee Teck Ng, Peter M. Chen

August 1998 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 7 Issue 3

Full text available: pdf(123.18 KB) Additional Information: full citation, abstract, index terms

Recent results in the Rio project at the University of Michigan show that it is possible to create an area of main memory that is as safe as disk from operating system crashes. This paper explores how to integrate the reliable memory provided by the Rio file cache into a database system. Prior studies have analyzed the performance benefits of reliable memory;

we focus instead on how different designs affect reliability. We propose three designs for integrating reliable memory into databases: non ...

Keywords: Main memory database system (MMDB), Recovery, Reliability

20 Session 8D: embedded tutorial: Test of future system-on-chips

Yervant Zorian, Sujit Dey, Michael J. Rodgers

November 2000 **Proceedings of the 2000 IEEE/ACM international conference on Computer-aided design**

Full text available: pdf(140.88 KB) Additional Information: full citation, abstract, references, citings

Spurred by technology leading to the availability of millions of gates per chip, system-level integration is evolving as a new paradigm, allowing entire systems to be built on a single chip. Being able to rapidly develop, manufacture, test, debug and verify complex SOCs is crucial for the continued success of the electronics industry. This growth is expected to continue full force at least for the next decade, while making possible the production of multimillion transistor chips. However, to mak ...